

## METHOD OF ETCHING HIGH ASPECT RATIO OPENINGS

### ABSTRACT OF THE DISCLOSURE

5 A method of etching a deep, high aspect ratio opening in a silicon substrate includes etching the substrate with a first plasma formed using a first gaseous mixture including a bromine containing gas, an oxygen containing gas and a first fluorine containing gas. The etching process with the first gaseous mixture produces a sidewall passivating deposit, which builds up near the opening entrance. To reduce this buildup, and to increase the average etching rate, the sidewall passivating deposit is periodically thinned by forming a second plasma using a mixture containing silane and a second  
10 fluorine containing gas. The substrate remains in the same plasma reactor chamber during the entire process and the plasma is continuously maintained during the thinning step. Holes of a depth greater than 40 times the width may be produced using repeated cycles of etching and thinning.

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